

LCW Upgrades - Final

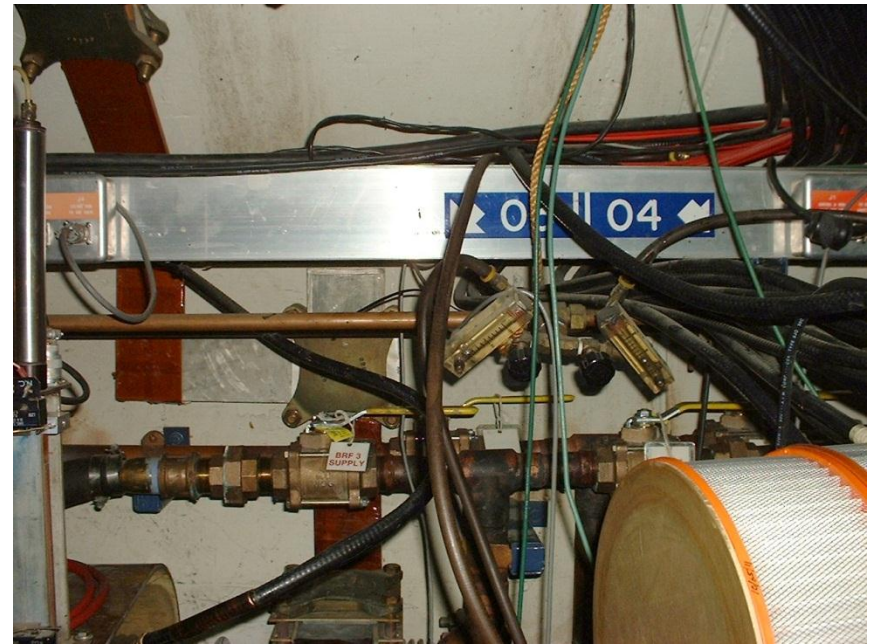
- **Booster RF Cavity LCW Isolation Valve Replacement.**
 - 8 valves and unions previously replaced
 - An additional 10 valves and unions were replaced during long shut-down. The remaining 20 will be replaced when possible - coordinate with cavity rework schedule.
 - Remaining Stations: 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
- **Booster Bus LCW Strainer and Isolation Valve Replacement.**
 - Remove existing Y-strainers and replace with basket strainers at wall opposite beamline. Replace isolation valves.
 - Strainers at 6 locations were installed: 1, 3, 6, 7, 13, & 19
 - Basket strainer and parts for the remaining 7 locations have been purchased and will be installed when possible.

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Booster Cavity LCW Isolation Valve Replacement



Old Valves at 03 & 04



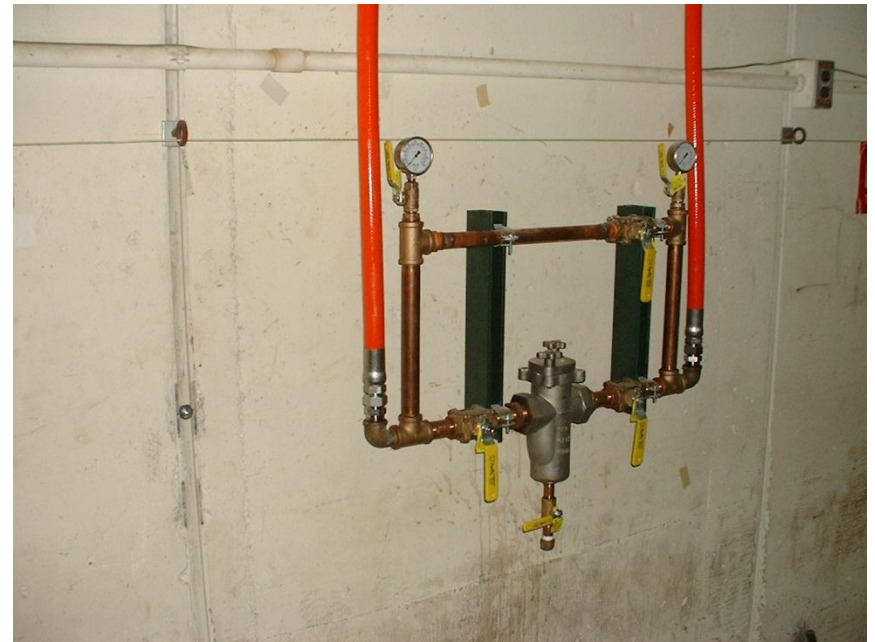
New Valves at 03 & 04

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Booster Cavity LCW Strainer & Isolation Valve Replacement



Old Strainer & Valves at 07



New Strainer and Valves at 07

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- Finish connection of LCW Return piping in East and West Booster Galleries to LCW Return piping at CUB.
 - All work was completed at the end of August 2012
- LCW Return Pump at CUB
 - Remove northern most old, existing return pump, and install previously purchased pump, and relocate valves to allow return pump isolation.
 - All work was completed early October 2012

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LCW Return Pump and LCW Return Piping at CUB



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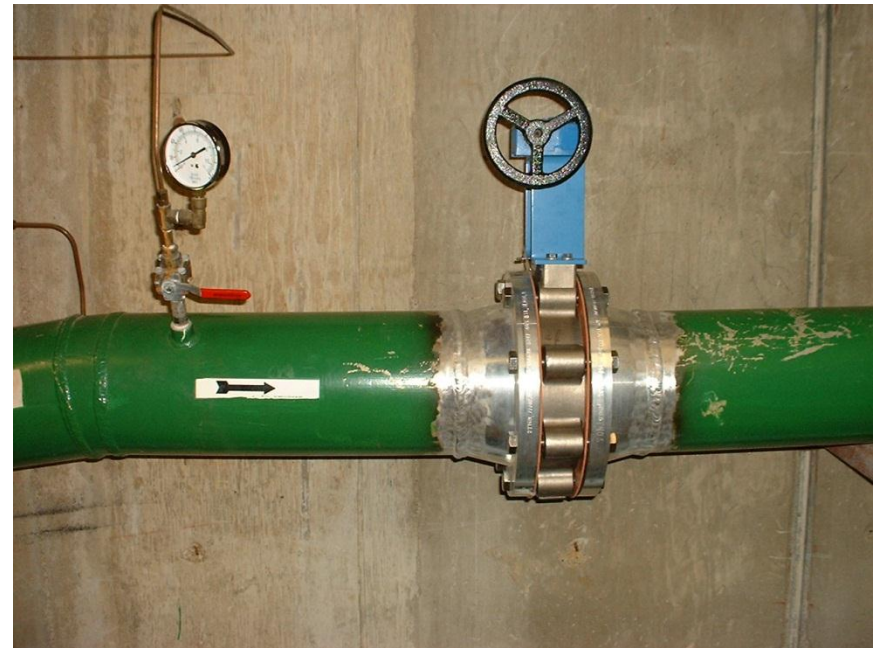
- Install LCW Isolation Valves in CUB Utility Tunnel
 - Work is complete
- EDWA Magnets
 - Repipe EDWA magnet coils in parallel instead of in series
 - Work is complete
- Remove LCW Piping for Long 13 New Absorber
 - Remove sections of 95LCW piping and cap
 - Remove sections of 55LCW Supply and Return
 - Work is complete

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LCW Enclosure Isolation Valves in CUB Utility Tunnel



New Valve in LCW Return from Enclosure



New Valve in LCW Supply to Enclosure

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Remove LCW Piping for Long 13 New Absorber



Removed 55 LCW and Capped 95 LCW



Removed 55 LCW and 95 LCW

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- Miscellaneous LCW Work
 - Magnet bus hose fittings for drainage
 - Repair Choke leaks and Choke Tubing
 - Remove Candy Cane Stop-Cocks and plug
 - Replace Long 3 LCW Hoses
 - Replace 400 MeV LCW hoses up chute
 - Install LCW bypasses at return valves in the Galleries
 - Work above is complete

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- Booster Refill, Leak Testing, Commissioning and Balancing
 - Booster LCW has been refilled
 - Leak checking complete (never really complete!)